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OVERVIEW OF WILD PIG DAMAGE IN CALIFORNIA

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ABSTRACT: Pigs (Sus scrofa) were first introduced to California in 1769, and European wild boars were imported to Monterey County in 1925. Descendants of the domestic swine and European wild boars have bred and formed populations of wild pigs. By the mid-1960s 15 counties had populations of wild pigs. Today 45 of California's 58 (78%) counties have reported having populations of pigs. Wild pigs can cause significant damage to farm and rangelands, livestock, natural resources, environmentally sensitive habitats, and property. There are limited estimates of damage caused by wild pigs in California. A survey was sent to all County Agricultural Commissioners in California to document the extent and amount of damage occurring in 1996 and what control measures were taken to reduce the damage. Forty (40) counties responded to the survey and reported \$1,731,920 worth of damage caused by wild pigs.

KEY WORDS: Pig (Sus scrofa), European wild boar, wild pig, damage, disease

INTRODUCTION

Since first being introduced to North America, pigs have commonly been allowed to range and reproduce freely. As a result, they now occur in significant numbers throughout most states. In California, wild pigs currently occur in approximately 45 counties in California (Figure 1). Free ranging pigs frequently cause damage to natural resources, crops, livestock, and property.



Figure 1. Distribution of wild pigs in California (1996).

Damage to natural resource such as woodlands, and native plant communities is difficult to quantify and many times is unreported. However, with the increase in wild pig population and distribution, significant damage is Proc. 18th Vertebr. Pest Conf. (R.O. Baker & A.C. Crabb, Eds.) Published at Univ. of Calif., Davis. 1998.

accruing to property such as landscapes, golf courses, and agriculture (row crops, livestock, orchards, and irrigation systems).

A survey was sent to all County Agricultural Commissioners in California to collect data on damage caused by wild pigs.

Historical Background

Pigs (Sus scrofa) were first introduced by early settlers in North America in 1539 and California in 1769 (Barrett and Birmingham 1994). The early settlers utilized pigs for food and to clear land. Pigs were allowed to range freely to forage for mast crops throughout the oak woodlands of California, and scattered populations of feral pigs were soon established. In 1925, European wild boars were imported into Monterey County (Updike and Waithman 1996). Wild boars that escaped captivity readily bred with free ranging feral pigs to form a viable "wild pig" cross.

By the mid-1960s, as many as 15 counties had populations of wild pigs. According to recent surveys wild pigs have increased in population and expanded their range to at least 45 counties. Wild pigs have expanded their range by dispersing when rainfall patterns provide good forage conditions. In addition, considerable evidence suggests that humans illegally captured wild pigs, transported them to previously unoccupied areas, and released them primarily for hunting purposes (Updike and Waithman 1996).

The biology and ecology of wild pigs make them a very prolific species. Given sufficient nutrition, sows can have two litters a year, resulting in the potential for a wild pig population to double in approximately four months (Barrett and Birmingham 1994). Wild pigs are opportunistic omnivores and their diet may consist of a variety of plant material including mast, fruits, bulbs, and animal material including fish, snakes, frogs, insects, small mammals, birds, and livestock.

DAMAGE

Wild pigs can cause a variety of damage. They use their strong snouts and neck muscles to dig and overturn

soil in search of grubs, insects, mast, root bulbs, plant material, and fungus. This rooting (also called grubbing) activity can result in the destruction of crops and pasture (USDA 1992). Rooting also damages irrigation systems. farm ponds, fencing, and native plants which can lead to soil erosion problems. Wild pigs rooting on golf course fairways and greens can cause considerable damage in a single night. Wild pig depredation on livestock and poultry can cause high economic loss (Choquenot et. al. 1996). Livestock predation usually occurs on or near the lambing or calving grounds. Wild pigs kill newborn lambs and calves and younger, less mobile individuals. Death usually occurs by biting and crushing the skull or neck. Wild pigs also violently shake their victims causing injury and/or death. It is common for pigs to completely consume a carcass, leaving no evidence an attack occurred.

If the carcass is not entirely consumed, wild pig predation can sometimes be determined by characteristic feeding patterns (Pavlov and Hone 1982). Wild pigs can carry a number of diseases and parasites that can be transmitted to livestock, wildlife, and humans. In California, wild pigs can be carriers of Brucellosis, Cholera, Leptospirosis, Tuberculosis (Bovine, Avian, and Swine), Q fever, Trichinosis, Toxoplasmosis, Pseudorabies, and Plague (Barrett and Tietje 1993).

DAMAGE SURVEY

Although damage caused by wild pigs is easily identified, estimates of the economic value are limited. Producers in Texas and California reported to United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Wildlife Services (WS) that 1,473 sheep, goats, and exotic game animals were killed by wild pigs in 1991 (Barrett and Birmingham 1994). Depredation to calves and lambs can be difficult to identify because these small animals may be killed and completely consumed, leaving little or no evidence to determine whether they were killed or died of other causes and then were eaten.

A survey was sent to all County Agricultural Commissioners in California to document damage caused in California to crops, livestock, and property in 1996.

SURVEY RESULTS

Surveys to document wild pig damage were sent to all 58 California County Agricultural Commissioners. Forty of the 58 (69%) (Figure 2) counties responded to the survey. The 40 responding counties reported a total of \$1,731,920 in wild pig damage (Table 1).

All counties that reported damage, reported that rooting was the major damage type. Nine counties reported predation on livestock. Nine counties reported wild pigs rooting was causing significant erosion. Six counties reported wild pigs eating or causing damage to crops. Six counties responded that wild pigs either moved or introduced disease in the county. Ten counties reported damage caused to fruit trees or grapevines from wild pigs using them as scratch or rubbing posts.

Detailed description of areas in California that sustained extensive damage from wild pigs is listed below.



Figure 2. Reported wild pig damage in California (1996).

Mendocino County

Mendocino County reported that wild pigs caused \$65,500 in damages to pasture and rangeland. An estimated 4,000 acres (1,600 ha) were rooted in the last year at a cost of \$40,000. The second leading cause of damage was estimated at \$20,000 for rebuilding damaged or installing new fences around properties to prevent further damage from wild pigs. Damage was also documented to residential lawns and small vineyards, however, no dollar figure was available. The California Department of Fish and Game (CDFG) issued two depredation permits in 1995 and three in 1996. Hunter surveys for 1995 and 1996 recorded there were 1,742 and 1,501 wild pigs taken, respectively.

Contra Costa County

The Contra Costa Water District is investing \$5 million into a wetland and oak woodland mitigation project to the Los Vaqueros Project. As part of the mitigation agreement, the Water District must preserve and enhance a variety of habitat types for wildlife. Wild pigs have caused extensive damage to these newly developed habitats. For example, wild pigs severely damaged a 38 acre (15.2 ha) area of newly planted oaks the night after planting. There are numerous plant and animal endangered species that occur in the Los Vaquerous Watershed Area that could be negatively impacted by habitat destruction caused by pigs. The Water District is currently working to reduce damage, under a depredation permit issued by CDFG. However, the permits are limited on the number of animals that can be taken.

County	Resource Damaged	Dollar	Complaints	Permits ¹ 1995-1996	Hunter Harvest ² 1995-1996
		Value			
Alameda	hay/forage/ponds	11,500	increasing	1-4	493-308
Alpine ³					100 Cont 100 Cont 10
Amador	lawns	100	same	0-0	0-38
Butte	lawn/range/drainage	500	same	1-0	0-269
Calaveras	lawn/range/ponds	10,500	increasing	0-0	0-0
Colusa	orchards/vineyards/ponds	50,000	increasing	0-0	526-154
Contra Costa	lawn/range/pond/irrigation	130,000	increasing	2-4	66-38
Del Norte ³					A DESCRIPTION OF THE OWNER
El Dorado					0-77
Fresno	livestock/hay/tree/irrigation	62,720	increasing	2-3	658-539
Glenn	livestock/crops/ponds	9,500	increasing	0-0	66-616
Humboldt ³ Imperial ³				1-1	99-38
Kem	crons/pasture/ponds/irrigation	14,000	increasing	0-0	99-423
Kings	pasture/ponds	2,600	same	0-0	296-539
Los Angeles ³	Para Para Para Para Para Para Para Para	_,		4-1	33-0
Madera	pasture	2.000		0-1	132-154
Mendocino	fruit/pasture/ponds/drainage	66,500	increasing	2-3	1.742-1.501
Merced	nuts/irrigation	8,500	increasing	0-0	559-3,155
Modoc ³	ndus milbanon	0,000			
Mono ³					
Monterev ³				7-20	4.537-2.501
Nana	hay/pasture/irrigation	6,500	increasing	4-2	395-77
Nevada	lawns/pasture/drainage	1,705	increasing	2-1	0-269
Orange ³	in the protocol dramage	-,		1 A 1997	I multipolitie
Placer	pasture/lawns/ponds	10,100	same	0-0	0-0
Plumas ³	Pustar er an ins Postas	,			The state
Riverside	lawn/sod/ponds	2,000	increasing	0-2	66-154
Sacramento ³	and conposed	-,			0.400.000
San Benito	crops/calves/irrigation	858,700	increasing	10-21	1,381-1,963
San Luis Obispo	fruit/crops/irrigation	62,200	increasing	15-12	1,677-1,809
San Mateo	fruit/crops/irrigation	50,500	increasing	2-0	0-38
Santa Barbara	fruit/crops	0	increasing	1-2	888-2,501
Santa Cruz	crops/road/pond/drainage	253,200	increasing	50-30	395-308
Sierra ³					0-30
Siskiyou	livestock/hav/ponds	1,400	same	0-2	0-38
Solano	fruit/pasture/ponds	4,500	increasing	3-7	197-77
Sonoma	livestock/pasture/irrigation	79,000	increasing	3-3	2,301-1,231
Stanislaus	lawn/pasture/irrigation	6,250	same	0-0	888-462
Sutter	livestock/nuts/ponds/irrigation	19,000	increasing	5-4	0-77
Tehama	pasture/nut/pond/drainage	7,500	same	9-2	132-885
Tuolumne	livestock/lawn/drainage	700	increasing	0-0	33-38
Yuba	rangeland/pasture/drainage	250	same	0-0	0-0
Total		1,731,290			- 1 - 1 - I

Table 1. Results of wild pig damage and harvest data for the 40 counties responding to the survey.

¹CDFG Depredation Permit Reports. ²CDFG Hunter Take Survey 1995 to 1996. ³Counties responded no damage.

East Bay Regional Park District (Park). The Park is a public agency that maintains open space in several counties around the San Francisco Bay. The Park District has had a wild pig management program in place since 1993 in seven parks. The overpopulation of wild pigs has caused extensive damage to natural resources which has direct negative impacts on the area's endangered species. Wild pigs in the parks have caused a human health and safety concern with several incidents of wild pigs charging district employees and, on one occasion, charging a group of school children. Damage caused to turf and irrigation systems is approximately \$10,000 annually. The Park District has 300 ponds and estimates a cost of approximately \$2,500 to \$5,000/pond to exclude wild pigs. The Park District spends in excess of \$60,000 a year to reduce wild pig damage within the seven parks.

<u>Residential subdivisions/golfcourse</u>. Four residential subdivisions and one golf course sustained approximately \$64,000 per year for wild pigs rooting turf and ornamental plants. A total of 31 residential properties have suffered wild pig damage to their landscape.

San Benito County

Wild pigs have caused \$858,700 in damages to walnuts, vineyards, grains, golf course turf, predation to calves, and transferring diseases to livestock. Diseases transmitted to domestic animals in 1996 cost between \$10,000 to \$15,000. Wild pigs caused \$20,000 damage to native plants and property on the 16,000 acre (6,400 ha) Pinnacles National Monument. The cost to fence the national monument was priced at \$600,000. Vineyards in the Park sustained approximately \$35,000 in damages from wild pigs. The cost to replace and repair irrigation systems within the county was \$14,500. The CDFG issued 10 and 21 depredation permits in 1995 and 1996, respectively. Hunter surveys recorded 1,381 and 1,963 wild pigs taken in 1995 and 1996, respectively.

San Mateo County

Wild pigs caused \$635,000 in damage to kiwi, artichokes, cut flowers, and peas in San Mateo County. There are 13 threatened and endangered plant species in this county. The CDFG issued two depredation permits in 1995 and none in 1996. Hunters removed zero wild pigs in 1995 and 38 in 1996.

Santa Cruz County

A total of \$252,200 in damages was reported. Artichokes and leaf lettuce combined for a total of \$161,000 in damages. Rooting of pasture and rangeland totaled 962 acres (390 ha) with a damage value of \$13,000, while pumpkins, sweet corn, and oat hay totaled \$7,200. Road and trail maintenance cost \$5,000 and fence improvements cost \$6,000. The Office of the Agricultural Commissioner in Santa Cruz County states that the above figures are minimal compared to the true economic and environmental impact that the wild pigs are having on the county. There is 1,000 miles (1,600 km) of permanent stream in the county of which over 500 miles (800 km) have experienced some type of damage such as wallowing, repeated stream crossings, and rooting up of aquatic vegetation, which is detrimental to stream and water quality. It is estimated that over two percent (2%) of the county's wetlands, 20 miles (32 km) of riparian habitat, and 2,200 acres (880 ha) of forest land have sustained damage which has also impacted the water supply to ranchers, small farmers, and homeowners. Property owners in the Santa Cruz Mountains who get their water supplied to them by spring, must fence around the springs or face a deficiency in their domestic and irrigation water. There are 10 plant species listed on the threatened and endangered species list. According to CDFG there were 50 depredation permits issued in 1995 and 30 permits issued in 1996. The hunter survey indicated that 395 and 308 wild pigs were harvested in 1995 and 1996, respectively.

San Luis Obispo County

San Luis Obispo County reported \$62,200 in damages caused by wild pigs to orchards and property. Wild pigs caused damage to avocados, citrus, row crops, oriental fruits, and vegetables throughout the county. Wild pigs not only cause damage by eating the fruit in the orchards, they also cause damage by tusking (debarking) trees and damaging drip-line irrigation systems. Nets installed in feijoa orchards to catch falling fruit are damaged by pigs searching for the ripening crop. One orchardist reported wild pigs were causing the spread of Phytophthora Root Rot, a fungal disease in the soil. Wild pigs rooting and disturbing feeder roots reportedly spread this fungal disease throughout the orchard.

CONCLUSION

Since the 1960s, wild pigs have expanded their range from 15 counties to presently over 45 counties. This expansion has increased the number of complaints received about wild pig damage. Damage has also expanded to a wider variety of resources affecting both rural and urban areas. This survey represents a small percentage of the actual damage occurring in the state. There is a need for a more long-term indepth reporting process to track wild pig damage. Until such a system is in place the overall significance of the problem will never be fully documented.

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